Claims

1. A microelectrical mechanical optical display system, comprising:

an illumination source that provides illumination light;

a collimating lens that receives and collimates the illumination light;

a microlens array having an array of plural lenslets and receiving the illumination light from the collimating lens;

an aperture plate through which plural pixel apertures extend, the plural pixel apertures being aligned with and receiving the illumination light from the plural lenslets of the microlens array;

a microelectrical mechanical reflector array positioned opposite the aperture plate from the microlens array, the microelectrical mechanical reflector array including plural microelectrical mechanical actuators that support reflectors in alignment with the plural pixel apertures to receive and reflect the illumination light, the plural microelectrical mechanical actuators orienting the reflectors selectively to direct the illumination light back through the pixel apertures or against the aperture plate; and

a display screen that receives the illumination light passing the microelectrical mechanical optical modulator.

2. The display system of claim 1 further comprising a selective reflector positioned to receive the illumination light from the collimating lens and to direct the illumination light to the microlens array.

3. The display system of claim of claim 2 in which illumination light directed back through the pixel apertures by the reflectors is transmitted through the selective reflector toward the display screen.

4. The display system of claim 3 in which the selective reflector includes a beamsplitter.

5. The display system of claim 1 in which the microelectrical

mechanical reflector array is formed on a planar substrate and the plural microelectrical mechanical actuators support the reflectors on actuator arms that in one state are co-planar with the substrate and the reflectors.

6. The display system of claim 1 in which the microelectrical mechanical actuators are electrostatic microelectrical mechanical actuators.

7. The display system of claim 6 in which the microelectrical mechanical actuators have first and second orientation states, only one of which requires electrostatic activation.

8. The display system of claim 6 in which the plural microelectrical mechanical actuators support the reflectors on actuator arms that are formed as bimorphs having a characteristic residual stress.

9. The display system of claim 8 in which the microelectrical mechanical actuators have an electrostatic activation that operates against the characteristic residual stress of the actuator arms.

10. The display system of claim 1 in which the microelectrical mechanical actuators orient the reflectors selectively according to drive signals provided by display drivers, the system further comprising an orientation storage system separate from the display drivers to selectively hold the microelectrical mechanical actuators in at least one orientation.

11. The display system of claim 1 in which the illumination source includes only one light source.

12. The display system of claim 1 in which the display screen is a transmissive display screen.

13. The display system of claim 1 in which the illumination source is monochromatic.

14. The display system of claim 1 in which the illumination source is polychromatic.

15. The display system of claim 14 in which the illumination source provides different chromatic segments of the illumination light over

different successive time periods.

16. A microelectrical mechanical optical display engine, comprising:

a microlens array having an array of plural lenslets for receiving and directing illumination light;

an aperture plate through which plural pixel apertures extend, the plural pixel apertures being aligned with and to receive illumination light from the plural lenslets of the microlens array; and

a microelectrical mechanical reflector array positioned opposite the aperture plate from the microlens array, the microelectrical mechanical reflector array including plural microelectrical mechanical actuators that support reflectors in alignment with the plural pixel apertures to receive and reflect the illumination light, the plural microelectrical mechanical actuators orienting the reflectors selectively to direct the illumination light back through the pixel apertures or against the aperture plate.

17. The display engine of claim 16 in which the microelectrical mechanical actuators are electrostatic microelectrical mechanical actuators.

18. The display engine of claim 17 in which the microelectrical mechanical actuators have first and second orientation states, only one of which requires electrostatic activation.

19. The display engine of claim 17 in which the plural microelectrical mechanical actuators support the reflectors on actuator arms that are formed as bimorphs having a characteristic residual stress.

20. The display engine of claim 19 in which the microelectrical mechanical actuators have an electrostatic activation that operates against the characteristic residual stress of the actuator arms.

21. The display engine of claim 16 in which the microelectrical mechanical actuators orient the reflectors selectively according to drive signals provided by display drivers, the system further comprising an

orientation storage system separate from the display drivers to selectively hold the microelectrical mechanical actuators in at least one orientation.

22. A microelectrical mechanical optical display engine, comprising:

a microlens array having an array of plural lenslets for receiving and directing illumination light;

an aperture plate through which plural pixel apertures extend, the plural pixel apertures being aligned with and to receive illumination light from the plural lenslets of the microlens array; and

a microelectrical mechanical reflector array positioned opposite the aperture plate from the microlens array, the microelectrical mechanical reflector array including plural microelectrical mechanical actuators that support reflectors in alignment with the plural pixel apertures to receive and reflect the illumination light, the plural microelectrical mechanical actuators orienting the reflectors selectively to direct the illumination light back through the pixel apertures or against the aperture plate,

whereby the microelectrical mechanical reflector array is formed on a planar substrate and the plural microelectrical mechanical actuators support the reflectors on actuator arms that in one state are co-planar with the substrate and the reflectors.

23. The display engine of claim 22 in which the microelectrical mechanical actuators are electrostatic microelectrical mechanical actuators.

24. The display engine of claim 23 in which the microelectrical mechanical actuators have first and second orientation states, only one of which requires electrostatic activation.

25. The display engine of claim 23 in which the plural microelectrical mechanical actuators support the reflectors on actuator arms that are formed as bimorphs having a characteristic residual stress.

26. The display engine of claim 25 in which the microelectrical

mechanical actuators have an electrostatic activation that operates against the characteristic residual stress of the actuator arms.

27. The display engine of claim 22 in which the microelectrical mechanical actuators orient the reflectors selectively according to drive signals provided by display drivers, the system further comprising an orientation storage system separate from the display drivers to selectively hold the microelectrical mechanical actuators in at least one orientation.